## REMARKS/ARGUMENTS

Applicants respectfully request that the Examiner consider the following remarks in addition to the amended and new claims presented above. Claims 24-26, 33-36, and 44-137 are pending in this application. Claims 68, 88, 110, and 132 have been amended to clarify that the ash fusion temperature refers to an ash fusion temperature characteristic. New Claims 134-137 have been added.

### 35 U.S.C. 112, First Paragraph Rejections

The Examiner rejected Claims 24-26, 33-36, 44-67, 73, 78, 79, 80, 81, 87, 88, 89, 95, 100, 101, 102, 109, 110, 122-124, 131, and 132 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description. Specifically, the Examiner rejected the above-referenced claims because, according to the Examiner, the following elements were not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors at the time the invention was filed, had possession of the claimed invention:

a) at least a portion of the iron bearing material fluxes the ash slag to produce a composite ash slag having at least one ash fusion temperature characteristic selected from the group consisting of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature less than the same ash fusion temperature characteristic of the ash slag produced from combustion of the solid fuel alone as required in Claims 24, 87, 109, and 131;

b) at least one carbon compound as required in Claims 57, 58, 78, 79, 100, 101, 122, and 123;

c) a pulverizer, wherein the solid fuel is fed to the pulverizer as required in Claims 52, 59, 73, 80, 95, 102, and 124;

d) ash fusion temperature characteristic is less than 2600°F as required in Claims 66, 88, 110, and 132.

e) sub-bituminous coal as required in Claims 48, 69, 91, and 113;

f) initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature less than 2600°F as required in Claims 66, 88, and 132;

g) the iron bearing material fluxes the ash slag to produce the ash slag as required in Claims 33, 68, 90, and 112;

h) the melting point of the composite ash slag is less than 2600°F as required in Claims 36, 66, 88, and 132;

i) the iron-bearing material is at least one of mill scale from steel production and dust from blast furnace gas cleaning equipment as required in Claims 53, 54, and 68;

j) at least one ash fusion temperature characteristic is fluid temperature as required in Claim 45;

k) a wet bottom boiler as required in Claims 24, 50, 51, 68, 72, 94, 112, and 116;

<u>The Law Regarding What Is Required to Comply with the Written Description Requirement</u>

"The examiner has the initial burden of presenting evidence or reasoning to explain why persons skilled in the art would not recognize in the original disclosure a description of the invention defined by the claims." MPEP§2163(I)(B)(3)(b). "The examiner, therefore, must have a reasonable basis to challenge the adequacy of the written description. The examiner has the initial burden of presenting by a preponderance of evidence why a person skilled in the art would not recognize in an applicant's disclosure a description of the invention defined by the claims." MPEP§2163.04. Further, "[u]pon reply by applicant, . . . [the examiner is required to] fully respond to applicant's rebuttal arguments, and properly treat any further showings submitted by applicant in the reply. When a rejection is maintained, any affidavits relevant to the 35 U.S.C. 112, para. 1, written description requirement, must be thoroughly analyzed and discussed in the next Office action." MPEP§2163.02. In the Office Action dated September 9, 2005, the Examiner did not provide any evidence why a person skilled in the art would not recognize in the applicant's disclosure a description of the invention defined by the claims nor respond to the Applicant's arguments as provided in the Applicant's response dated April 6, 2005. Instead, the rejections are conclusory

statements without any associated evidence, i.e,. "[c]laims 48, 69, 91, 113, refers to sub-bituminous coal which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention." *See* September 9, 2005 Office Action.

The declaration of Dr. Ramon Bisque, for example, filed with the Office Action Response of July 29, 2004 (attached again hereto as Exhibit "A," was evidence of precisely this understanding by one skilled in the relevant art. The Examiner cannot discount the statements of Dr. Bisque by simply stating that the declaration is unpersuasive, nor discount any showing of literal support in the specification, nor decline to provide any arguments in support of the rejections. The MPEP requires more. The Examiner, if he disagrees, needs to provide factual reasons explaining why one of ordinary skill in the art would not reasonably conclude that the inventor had possession of the claimed invention. Applicants submit that there is either literal support as provided for the claims or the limitations are inherently disclosed in the Specification of the Subject Application and the Provisional Application as set forth below. Applicants again note that the lack of literal support for specific claim terms is not enough to support a rejection under 35 U.S.C. § 112 where one of skill in the art would understand from the disclosure that the inventors had possession of the invention, as claimed, at the time of filing.

<u>Discussion of the 35 U.S.C. 112 Rejections</u>

a) <u>The Examiner's assertion that there is no support in the Specification for at least a portion of the iron bearing material fluxes the ash slag to produce a composite ash slag having at least one ash fusion temperature characteristic selected from the group consisting of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature less than the same ash fusion temperature characteristic of the ash slag produced from combustion of the solid fuel alone</u>

Claim 24 requires at least a portion of the iron bearing material to flux the ash slag to produce a composite ash slag having at least one ash fusion temperature characteristic selected from the group consisting of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature less than the same ash fusion temperature characteristic of the ash slag produced from combustion of the solid fuel alone. Claims 87, 109, and 131 each require, during the combustion of the solid fuel in the presence of the iron-bearing material, that at least one ash fusion temperature characteristic selected from the group consisting of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature be less than the same ash fusion temperature characteristic of an ash slag produced from combustion of the solid fuel alone.

There is more than ample support for these elements in the present application ("the Subject Application") and the U.S. Provisional Application 60/213,915, filed June 26, 2000 ("the Provisional Application"), which was incorporated by reference in its entirety in the Subject Application. The Subject Application and the Provisional Application each state that the iron-bearing additive fluxes the ash and lowers the melting temperature of the ash. *See e.g.* Provisional Application at page 3, "[i]t is the use of these byproducts of steel and iron manufacturing to *flux the ash* and improve the cyclone operation that is new and unique" and at page 1 "[t]he iron both reduces the melting temperature of the ash, and reduces the slag viscosity at these temperatures due to the presence of iron aluminosillicate crystals in the ash." (Emphasis added). *See e.g.* Subject Application at page 6, lines 19-22, "[t]he iron-containing additive can be in any form and any composition so long as iron is present in sufficient amounts *to flux effectively the feed material*" and page 7, lines 15-18 "...it is believed that the presence of iron in the calcium aluminosilicate slags of western coals causes a decrease in the melting temperature of the ash and crystal formation in the melt when a critical temperature ($T_{CV}$) is reached." *See also* page 5, lines 13-14 page 8, lines 10-11, Figs. 7-8 and page 20, lines 1-21 of the Subject Application.

Thus, the Specifications of the Subject and Provisional Applications clearly provides that the iron-bearing additive fluxes the ash and resultingly lowers the melting temperature of the ash. This

melting temperature has a value and ash fusion characteristics ("AFT") inherently associated with the melting temperature (value). For western coals, a reduction in melting temperatures equates a reduction in an ash fusion temperature charcateristic.

As set forth in the Declaration of Dr. Ramon Bisque under 37 CFR § 1.132 ("Bisque Declaration"), attached hereto as Exhibit A, which was submitted in the previous Office Action Response of July 29, 2004, the AFT characteristics of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature represent a continuum of constituent melting points leading to the melting temperature of the ash. The characteristics are arbitrary and established by subjective visual observation. (*See* Bisque Declaration at ¶13.)

One method of determining the different AFT characteristics corresponding to the melting temperature of the ash is set forth at pages 20-5 through 20-7 of *"Steam/its generation and use"*, by Babcock & Wilcox (1972) ("the Babcock & Wilcox Article" attached to the Bisque Declaration, the AFT properties are determined as part of the ASTM Standard D 1857, *Fusibility of Coal and Coke Ash*.") According to the standard, an ash sample is prepared by burning coal under oxidizing conditions at temperatures of 1470 to 1650° F. The ash is pressed into a mold to form a triangular pyramid cone 0.75 in. in height with a 0.25 in. triangular base. The cone is heated in a furnace at a controlled rate to provide a temperature increase of 15° F per minute. The initial deformation temperature (IT or ID) refers to the temperature at which the tip of the pyramid begins to fuse or show signs of deformation. The softening temperature (ST) is the temperature at which the sample has deformed to a spherical shape where the height of the cone is equal to the width at the base (H=W). The softening temperature is commonly referred to as the fusion temperature. The hemispherical temperature (HT) is the temperature at which the cone has fused down to a hemispherical lump and the height equals one half the width of the base (H=1/2W). The fluid temperature (FT) is the temperature at which the ash cone has melted to a nearly flat layer with a maximum height of 0.0625 in. (*See* Bisque Declaration at ¶14.)

It is well known that each of the AFT characteristics, namely IT, ST, HT, and FT, represent a melting point of one or more ash constituents. Regarding the relationship between the AFT properties and the melting point of the ash, the Babcock & Wilcox Article states:

> The gradual deformation of the ash cone is generally considered to result from differences in melting characteristics of the various ash constituents. As the temperature of the sample is increased, compounds with lowest melting temperature begin to melt, causing the initial deformation. As the temperature continues to increase, more of the compounds melt and the degree of deformation proceeds to the softening and hemispherical stages. The process continues until the temperature is higher than the melting point of most of the ash constituents and the fluid stage is reached.

(The Babcock & Wilcox Article at page 20-6.) (Bisque Declaration at ¶15.)

Thus, by having a melting point, one skilled in the art would readily appreciate that the ash must also have a continuum of AFT characteristics selected from the group consisting of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature in the disclosure.

Regarding the requirement in Claims 24, 87, 109, and 131 that the iron-bearing material cause a reduction in at least one AFT characteristic and ash slag melting point relative to the ash slag in the absence of the iron-bearing material. The Provisional and Subject Applications refer to the iron-containing additive lowering the $T_{250}$ (or the temperature at which the ash would have a viscosity of 250 poise, which is an important indicator for the minimum temperature at which the slag will flow) for low-sulfur eastern and western coals having low iron and high calcium contents. (*See e.g.* Provisional Application at pages 1 and 4-5 and Subject Application at Fig. 2, page 2, lines 15-17, page 7, lines 15-18, page 9, lines 14-15, page 19, lines 5-10, Figs. 7-8 and page 20, lines 3-21). *See also* page 7, lines 15-18 "...it is believed that the presence of iron in the calcium aluminosilicate slags of western coals causes a *decrease in the melting temperature* of the ash and crystal formation in the melt when a critical temperature ($T_{CV}$) is reached." (Emphasis added.)

For at least the reasons set forth above, the AFT-characteristic and fluxing limitations are each described in the specifications of both the Provisional and Subject Applications in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time each of the applications was filed, had possession of the claimed invention because it is inherent in the Specification that the AFT's of the ash slag will be reduced by the disclosed iron-bearing materials.

b) The Examiner's assertions that there is no support in the Specification for at least one carbon compound

Claims 57-58, 78-79, 100-101, and 122-123 requires the iron-bearing material to contain at least one carbon compound, with Claims 58, 79, 101, and 123 requiring the carbon compound to promote the reduction of iron oxides. The Subject and Provisional Applications each reference at least one carbon compound that would be understood by one of ordinary skill in the art to promote reduction of iron oxides, such as hematite, magnetite, and wustite, under the thermal conditions of the combustion chamber. Such carbon compounds include hydrocarbons in the coal feed itself (*See e.g.* Subject Application at page 6, lines 7-8 ("coal refers to macromolecular network comprised of groups of polynuclear *aromatic rings* to which are attached subordinate rings connected by oxygen, sulfur and *aliphatic bridges*"); oils and greases (*See e.g.* Subject Application at page 12, lines 14-17 "[t]he additive can also be a sludge containing iron plus oils and greases..."); xanthan gum (*See e.g.* Subject Application at page 13, lines 10-13. "Organic and/or inorganic adhesives can be added to the slurried material to increase the cohesiveness of the material...Laboratory tests have shown that *xantham gum* [a carbon-containing material] lead to very cohesive agents"); and ethylene glycol ($C_2H_6O_2$), which may be added to the iron-bearing material as a flow aid (Provisional Application at page 8 and Subject Application at page 15, lines 1-2).

Moreover, the Subject Application states at page 12, lines 9-12 that "[p]referably, the additive is the collected fines (flue dust...) from the offgas(es) of blast furnace." One skilled in the art would readily appreciate that such fines would contain carbon components. For example, U.S. Patent No.

6,484,651 to Shephard et al. at col. 8, lines 14-16 teaches that "[c]arbon may be present in the iron-bearing materials in the form of, for example, blast furnace flue dust...to promote reduction of the iron oxides to more readily flux the fuel ash." Thus, the Subject Application teaches the presence of at least one carbon compound in the iron-bearing material to promote the production of iron oxides because flue dust (as taught by the Subject Application) inherently contains at least one carbon compound to promote the production of iron oxides.

c) <u>The Examiner's assertions that there is no support in the Specification for a pulverizer, wherein the solid fuel is fed to the pulveriser</u>

Claims 52, 59, 73, 80, 95, 102, and 124 require a pulverizer, wherein the solid fuel is fed to a pulverizer. At page 5, lines 16-17, the Specification of the Subject Application states that "[t]he methods and compositions are particularly effective for a cyclone furnace of the type illustrated in Fig. 1." In the Background of the Invention section, at page 1, line 24 to page 2, line 2, the Specification of the Subject Application states in describing the furnace depicted in Fig. 1, that:

> The depicted combuster design is used in a cyclone furnace of the type manufactured by Babcock and Wilcox. Cyclone furnaces operate by maintaining a sticky or viscous later of liquid (melted) ash (or slag) not shown on the inside cylindrical walls 104 of the cyclone combustion chamber 108. <u>*Coal is finely crushed (e.g. to minus 1/4 inch top size)*</u>, entrained in an air stream, and blown into the combustor end 112 of the cyclone combustor or combustor 100 through coal inlet.
> (Emphasis added.)

Since *Webster's New World Dictionary, 2nd College Ed.*, for example, defines the term "pulverize" as "to *crush*, grind, etc. into a *powder* or dust," i.e. to finely crush, the Specification of the Subject Application clearly provides for a structure to pulverize or finely crush the solid fuel. Inherently, the apparatus must also have a feed mechanism to direct the fuel to the pulverizer. Thus, a pulverizer is described in the Specification of at least the Subject Application in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time each of the applications was filed, had possession of the claimed invention.

d) <u>The Examiner's assertions that there is no support in the Specification for the at least one ash fusion temperature characteristic being less than 2600°F</u>

Claims 66, 88, 110, and 132 require that at least one AFT characteristic selected from the group consisting of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature be less than 2600°F. The Provisional Application at page 1 and the Subject Application at page 2, lines 14-15, disclose that ash is melted at normal combustion temperatures ranging from 2600 to 3000°F. The Subject Application and the Provisional Application thereafter each state that the iron-bearing additive fluxes the ash and lowers the melting temperature of the ash. *See e.g.* the Subject Application at page 7, lines 15-18 "...it is believed that the presence of iron in the calcium aluminosilicate slags of western coals causes a decrease in the melting temperature of the ash and crystal formation in the melt when a critical temperature ($T_{CV}$) is reached." As discussed previously in Section (a), if the ash has a melting point of a value less than 2600°F, the ash must also have a continuum of AFT characteristics wherein at least one characteristic selected from the group consisting of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature in the disclosure is less than 2600° F. For western coals, a reduction in melting temperatures equates a reduction in an ash fusion temperature charcateristic. Thus, the elements of Claims 66, 88, 110, and 132 are described in the specifications of both the Provisional and Subject Applications in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time each of the applications was filed, had possession of the claimed invention.

e) <u>The Examiner's assertions that there is no support in the Specification for sub-bituminous coal</u>

Claims 48, 69, 91, and 113 require the solid fuel to include a sub-bituminous coal. At page 6, line 11, of the Specification of the Subject Application, there is literal support for the requirement of sub-bituminous coal in Claims 48, 69, 91, and 113:

> The coal-containing feed material has coal as the primary component. As used herein 'coal' refers to macromolecular network comprised of groups of polynuclear aromatic rings, to which are attached subordinate rings connected by oxygen, sulfur, and aliphatic bridges. Coal comes in various grades including peat, lignite, ***sub-bituminous coal***, and bituminous coal. (Emphasis added.)

Thus, there is clearly literal support in the Specification for the limitation of sub-bituminous coal.

f) <u>The Examiner's assertions that there is no support in the Specification for at least one of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature less than 2600°F as required in Claims 66, 88, and 132</u>

This rejection is substantially similar to the rejections set forth in Section (d) above. Claims 66, 88, and132 require that at least one AFT characteristic selected from the group consisting of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature be less than 2600°F. The Provisional Application at page 1 and the Subject Application at page 2, lines 14-15, disclose that ash is melted at normal combustion temperatures ranging from 2,600 to 3,000°F. The Subject Application and the Provisional Application thereafter each state that the iron-bearing additive fluxes the ash and lowers the melting temperature of the ash. *See e.g.* the Subject Application at page 7, lines 15-18 "...it is believed that the presence of iron in the calcium aluminosilicate slags of western coals causes a decrease in the melting temperature of the ash and crystal formation in the melt when a critical temperature ($T_{CV}$) is reached." As discussed previously in Section (a), one skilled in the art would readily appreciate that if the ash has a melting point of a value less than 2600° F, the ash must also have a continuum of AFT characteristics wherein at least one characteristic selected from the group consisting of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature in the disclosure is less than 2600 ° F. For western coals, a reduction in melting temperatures equates a reduction in an ash fusion temperature charcateristic. Thus, the elements of Claims 66, 88, 110, and 132 are described in the specifications of both the Provisional and Subject Applications in such a way as to reasonably

convey to one skilled in the relevant art that the inventor(s), at the time each of the applications was filed, had possession of the claimed invention.

g) The Examiner's assertions that there is no support in the Specification for at least a portion of the iron-bearing material fluxes the ash slag to produce a composite ash slag

Claims 24, 68, 90, and 112 require that at least a portion of the iron-bearing material fluxes the ash slag to produce a composite ash slag. The word "composite" means "formed of distinct parts." *Webster's New World Dictionary, 2nd College Ed.* Because the Specification at page 6, lines 1-2 clearly teaches the addition to the boiler of both an iron-bearing material and a solid fuel to form a slag layer, it is inherent that the ash slag in the boiler will be a composite in that it is formed from two distinct parts. Moreover, as discussed in Section (a) above, the Provisional and Subject Applications further use the term "flux" and "fluxing agent". *See e.g.* the Subject Application at page 6, lines 19-22, "[t]he iron-containing additive can be in any form and any composition so long as iron is present in sufficient amounts to *flux effectively the feed material.*" (Emphasis added). *See also* the Provisional Application at pages 1, 3-4, and 6-8 and the Subject Application at page 5, lines 13-14, page 6, lines 19-22, page 8, lines 10-11). According to *Hawley's Condensed Chemical Dictionary*, "flux" is defined as "[a] substance that promotes *fusing of minerals* or metals or prevents the formation of oxides." It further defines "fuse" as "[o]f a solid, to ***melt***, e.g., a fused salt." (Emphasis supplied.) The terms "flux" and "fuse" would further suggest to one of ordinary skill in the art that the various components are combined to form a composite ash slag in the Provisional Application and Subject Application. (Bisque Declaration at ¶17). Thus, there is more than ample support in the specification for the requirement that at least a portion of the iron-bearing material fluxes the ash slag to produce a composite ash slag.

h) The Examiner's assertions that there is no support in the Specification for melting point of the composite ash slag being less than 2600°F

Claim 36 requires that the melting point of the composite ash slag is less than 2600 degrees F. The Provisional Application at page 1 and the Subject Application at page 2, lines 14-15, disclose that ash is melted at normal combustion temperatures ranging from 2600 to 3000° F. The Subject Application and the Provisional Application thereafter each state that the iron-bearing additive fluxes the ash and *lowers* the melting temperature of the ash. *See e.g.* the Subject Application at page 7, lines 15-18 "...it is believed that the presence of iron in the calcium aluminosilicate slags of western coals causes a decrease in the melting temperature of the ash and crystal formation in the melt when a critical temperature ($T_{CV}$) is reached" and page 2, lines 17-19, "[i]ron both reduces the melting temperature of the ash and increases the slag velocity at these temperatures due to the presence of iron aluminosilicate crystals in the melt." Since the Specification of the Subject Application teaches a composite slag having the iron additive will cause the slag to have a melting point less than the normal combustion temperature of 2600°F, the requirement of Claim 36 is expressly described in the Specifications of both the Provisional and Subject Applications in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time each of the applications was filed, had possession of the claimed invention. *See* Section (d) above for a discussion of Claims 66, 88, 110, and 132 that require that at least one AFT characteristic selected from the group consisting of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature be less than 2600°F.

i) <u>The Examiner's assertions that there is no support in the Specification for the iron-bearing material being at least one of mill scale from steel production and dust from blast furnace gas cleaning equipment</u>

Claims 53, 54, and 68 require that the iron-bearing material be one of mill scale from steel production and dust from blast furnace gas cleaning equipment. The Specification of the Subject Application at page 12, lines 7-12 states that:

> The additive can be manufactured by a number of processes. For example, the additive can be the particles removed by particulate collection systems...from off

> gases of steel or iron manufacturing or *mill scale fines*. Preferably, the additive is the collected *fines* (flue dust or electrostatic precipitator dust) from the off gas(es) of a *blast furnace*, Basic Oxygen Furnace (BOF), or electric arc furnace dust such as used in the iron or steel making industry. (Emphasis added.)

Therefore, there is clearly support in the specification for Claims 53, 54, and 68 because the Specification expressly discloses that the additive can be mill scale fines from steel production (manufacturing) or dust from blast furnace cleaning equipment.

j) <u>The Examiner's assertions that there is no support in the Specification for the at least one ash fusion temperature characteristic is a fluid temperature</u>

Claim 45 requires that at least one ash fusion temperature characteristic is a fluid temperature. As set forth in the Bisque Declaration, which was submitted in the previous Office Action Response of April 29, 2005, the AFT characteristics of initial deformation temperature, softening temperature, hemispherical temperature, and fluid temperature represent a continuum of constituent melting points leading to the melting temperature of the ash. The characteristics are arbitrary and established by subjective visual observation. (Bisque Declaration at ¶13.)

One method of determining the different AFT characteristics corresponding to the melting temperature is set forth at pages 20-5 through 20-7 of the Babcock & Wilcox Article, the AFT properties are determined as part of the ASTM Standard D 1857, "*Fusibility of Coal and Coke Ash*". According to the standard, an ash sample is prepared by burning coal under oxidizing conditions at temperatures of 1470 to 1650° F. The ash is pressed into a mold to form a triangular pyramid cone 0.75 in. in height with a 0.25 in. triangular base. The cone is heated in a furnace at a controlled rate to provide a temperature increase of 15° F per minute. The initial deformation temperature (IT or ID) refers to the temperature at which the tip of the pyramid begins to fuse or show signs of deformation. The softening temperature (ST) is the temperature at which the sample has deformed to a spherical shape where the height of the cone is equal to the width at the base (H=W). The softening temperature is commonly referred to as the fusion temperature. The hemispherical

temperature (HT) is the temperature at which the cone has fused down to a hemispherical lump and the height equals one half the width of the base (H=1/2W). The fluid temperature (FT) is the temperature at which the ash cone has melted to a nearly flat layer with a maximum height of 0.0625 in. (Bisque Declaration at ¶14.)

Each of the AFT characteristics, including the fluid temperature, represent a melting point of one or more ash constituents. Regarding the relationship between the AFT properties and the melting point of the ash, the Babcock & Wilcox Article states:

> The gradual deformation of the ash cone is generally considered to result from differences in melting characteristics of the various ash constituents. As the temperature of the sample is increased, compounds with lowest melting temperature begin to melt, causing the initial deformation. As the temperature continues to increase, more of the compounds melt and the degree of deformation proceeds to the softening and hemispherical stages. The process continues until the temperature is higher than the melting point of most of the ash constituents and the fluid stage is reached.

(The Babcock & Wilcox Article at page 20-6.) (Bisque Declaration at ¶15.)

Thus, by having a melting point, one skilled in the art would readily appreciate that the ash must also have a continuum of AFT characteristics, including a fluid temperature. Thus, Claim 45 is supported by the specification since the Specification discloses the ash has a meting point and it is well-established that by having a melting point, the ash will inherently have a fluid temperature associated with the melting point.

k) <u>The Examiner's assertions that there is no support in the Specification for a wet-bottom boiler</u>

Claims 24, 50, 51, 68 , 72, 94, 112, and 116 refer to a wet-bottom boiler. The Subject and Provisional Applications each expressly recite a wet-bottom boiler. *See* Subject Application at page 6, lines 15-18, "[t]he coal combustion chamber is part of a coal-fired furnace such as a slag-type furnace and any industrial boiler that produces a molten, liquid ash residue (known to the industry

as '*wet-bottom boilers*')." *See* Provisional Application at page 2, "[t]he invention may also be extended by those skilled in the art to apply to any industrial boiler that produces a molten, liquid ash residue (known to the industry as 'wet-bottom boilers')." Thus, the Provisional and Subject applications clearly disclose a "wet-bottom boiler" as claimed.

Based upon the foregoing, Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecution and/or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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